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AGENCY IMPACT DETERMINATION [for the proposed
installation of a rotary lime kiln at
Rocky Mountain Phosphates in Garrison, Montana]
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The Air Quality Bureau of the Montana Environmental Sciences Division has conducted an environmental review of the proposed installation of a rotary lime kiln at Rocky Mountain Phosphates in Garrison, Montana.

The Rocky Mountain Phosphate Company is in the business of producing a phosphate animal feed supplement for the cattle industry and also calcining limrock to produce lime. Presently, the company operates one phosphate kiln and one lime kiln.

Summary of Proposed Facility

They are presently seeking permission to construct a 24,000 lb/hr coal fired lime kiln with a Teller scrubber attached which will control particulate emissions to greater than 99 percent efficiency. In addition, the alkaline lime water produced by scrubbing the lime dust shall be utilized to neutralize the sulfur oxides produced by the burning of coal. This discharge water and sludge material will be carried to a holding pond where the calcium sulfate and other entrained material will settle out and the scrubbing water recycled to the scrubbers for reuse. Water lost by evaporation will be replaced by fresh water.

The company does have problems controlling fluoride emissions from their cooling ponds. However, they are now on a control program initiated by the Air Quality Bureau of the Montana Environmental Sciences Division in which they must cover all scrubber water discharge, and hold fluoride concentrations in the ponds to 100 ppm.

Description of Process

The process involved in this kiln equipment is to produce burned lime from limestone. This kiln is to be coal fired with coal from Western Energy Co. at Colstrip, Montana. The kiln temperature will read 2350° F in the hot zone which will cause the CO₂ to be released from limestone leaving calcium oxide or burned lime.

This unit is designed to use 7,000,000 BTU per ton of burned lime produced. About half of this is required to release the CO₂ and half is lost through exit gas temperature and heat loss of the unit. Limestone will be supplied by the Big Horn Calcium Co. of Warren, Montana, from their quarry at Drummond, Montana. This will be in 2 sizes, 1½" x 1½" and 1½" x 2½". Limestone is fed into the cold end of the F L Schmidt kiln at a rate of 16 tons per hour to produce 9 tons per hour of burned lime. Coal will be burned at a rate of 3.7 tons per hour to supply the heat necessary to drive off the CO₂. This will be pulverized at the time of burning and blown into the kiln continuously with high pressure air.

The stack gases and dust will be drawn off the cold end of the kiln into a Teller design scrubber with a concrete shell similar to the present scrubbers but enlarged to 3 times the capacity for lime scrubbing. The scrubber will have a baffle hanging from the concrete roof to force the gases down for better

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spray scrubbing in the 3 manifold water baths that the spray nozzles set up. This large section of the scrubber removes the lime dust and reduces the heat to approximately 130°F. This will call for 1250 gpm of water allowing for a 50°F temperature rise. The water will flow by gravity to an enclosed pond sized properly by Everly and Associates for precipitation of any lime or lime dust in the pond before reuse. Evaporation will cool this water for continuous recirculation.

A demister section will be installed consisting of a Tellerette bed in a basket at the gas outlet of the scrubber to minimize any water droplet entrainment of these scrubbed gases. The gases are then drawn into the American Standard fan and blown up the 50' stack. No dangerous emissions are expected. The sulfur compounds in the coal will be scrubbed out and chemically neutralized by the lime dust and scrubber water in the wet scrubber. Carbon dioxide from the burning of coal will go up the stack although a small amount of this will be absorbed in the scrubber water, but this is not harmful.

Burned lime is controlled by analyzing the available CaO on a shift basis or by grab sample. Stack gas analyses will be run by our laboratory to check our combustion efficiency. We expect to achieve a 90% operating factor since we will be operating at less than full capacity.

This product is necessary to treat liquid effluents at other plants, to treat drinking water supplies and when hydrated, for use by the contractors for highway construction. There is no commercial producer of this product in Montana except for us and the need is increasing.

Diffusion modeling has shown that control of 90% of sulfur oxide emissions will not result in ambient air violations under the worst possible meteorological conditions.

However, the sulfur oxide emissions, no matter how small, are an additional pollutant being added to an area which has experienced problems with fluorides.

We do not believe that an environmental impact statement is necessary for the proposed lime kiln facility and from all information which has been gathered to date, the installation of the scrubber facility should allow the facility to meet all state and federal emission and ambient air standards.

Anticipated emissions are as follows:

Particulate - 2-5 lb/hr assuming 99.5% control

Sulfur dioxide - 5-20 lb/hr assuming 90% control

The 20 lb/hr emission would be seen only if 2.0% sulfur coal were burned.

Carbon dioxide - 25,600 lb/hr

Nitrogen Oxides - 3-5 lb/hr

Water Vapor - 7117 lb/hr

Allowable Emission:

Particulate - 27.36 lb/hr
Sulfur Dioxide - 170 lb/hr

Allowable particulate emission based on process weight of 34,000 lb/hr which includes 24,000 lb/hr of limestone feed plus 10,000 lb/hr of coal. Montana regulation 16-2.14(1)-S1430, Particulate Matters, Industrial Processes.

Allowable sulfur emission based on heat input of 85,000,000 BTU/hr. One pound of sulfur per million BTU's = approximately 2 lbs of $\text{SO}_2/10^6$ allowed. Regulation of Sulfur in Fuel 16-2.14(1)-S1470, Sulfur Oxide Emissions

cc: State Library, Helena
Board of County Commissioners, Powell County Courthouse, Deer Lodge
Department of Fish and Game, Helena
Environmental Quality Council, Helena
Al Gerdtz, Garrison



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